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Jen-Lin Chao

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EXAMINER

ROBERTSON, DAVID

ART UNIT

PAPER NUMBER

3623

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DELIVERY MODE

06/16/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/646,179	Applicant(s) CHAO ET AL.	
	Examiner Dave Robertson	Art Unit 3623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 11 March 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This is a Non-final office action in response to Applicant's reply of 3/11/2008.

Claims 1-30 are pending.

Response to Amendment

2. Applicant amends claim 1, and similarly amending 6, 11, 16, 21, and 26, independent claims directed to various embodiments of the method of claims 1-5, to newly recite *providing a risk database...* and *dispatching parts...* according to high risk and low risk demand.

3. Applicant amends claims 11, 13, 15, 16, 18 and 20-30 to overcome objections to minor informalities. Accordingly, objections made in the prior office action are hereby withdrawn with the exception of claim 11, which continues to use the abbreviation "IC" (in the preamble); objection on this point for claim 11 is maintained.

Response to Arguments

4. Applicant's arguments with respect to all claims have been considered but are moot in view of the new ground(s) of rejection.

Response to Requirement for Information

5. Applicant responds to the Requirement for Information made in the prior office action by stating that "the information is not presently known by the Applicant and cannot be readily obtained", a sufficient response under 37 CFR 1.105.

Claim Objections

6. Claim 11 is objected to because of the following informalities: The term "IC" should be spelled out --integrated circuit--.

Appropriate correction is required

Claim Rejections - 35 USC § 112

7. **The following is a quotation of the first paragraph of 35 U.S.C. 112:**

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 1-30 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the **written description** requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention:

Claims 1, 6, 11, 16, 21, and 26 (all independent claims) recite a limitation *wherein the high risk part has a higher probability than the low risk part to be cancelled*. However, nowhere in the original disclosure is there mention of a probability of a part to be cancelled. (Examiner notes that the term "part" as used in the claim means "portion of" not "part" as in a physical component of a product.)

The original disclosure instead defines demand risk as low risk demand or high risk demand (see page 6 from line 11) and discloses probabilities placed on those risks (Table 1: LRD and HRD Order Rates). Although the disclosure alludes to risk that the

customer has overestimated their demand (page 2 line 9) resulting in an “overcommitted foundry,” still, the disclosure does not refer specifically to a probability that a part may be cancelled. As such, the claims introduce **new matter** not previously disclosed.

9. Claims 1-30 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the **enablement** requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claims 1, 6, 11, 16, 21, and 26 (all independent claims) recite a step of dividing demand into a low risk part (portion) and a high risk part. This dividing step is critical to the invention and central to the method of allocating portions of the demand to fabrication. However, nowhere in the specification or claims does Applicant provide disclosure of how this dividing is performed.

As is disclosed in the specification (Table 1 page 6 and page 7, lines 5-8, and page 9 from line 5), risk information is “collected and summarized by analyzing historical information for the demand plans and the purchase orders of each customer.” However, “analyzing historical information” does not provide sufficient information for one skilled in the art to determine what portion of demand is low risk and what portion is high risk, nor is there disclosed any external source of the risk information database or any process known to one skilled in the art to determine the dividing of the demand into

two portions and assigning a probability according to risk. As such the disclosure fails to enable the claimed step of dividing demand into a low risk part and a high risk part and providing a database of risk information. These are steps not immediately apparent to one skilled in the art and subject to variation in the myriads of ways in which demand could be divided. Therefore the disclosure fails to comply with the enablement requirement of 35 U.S.C. 112.

For the purposes of examination, lacking any defined method for dividing demand into a low risk portion and a high risk portion, the interpretation will be taken that *any method of dividing demand into two portions* would be sufficient to meet the metes and bounds of the claims.

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claims 6-10, 16-20, and 26-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention:

Claims 6-10 and 16-20 recite *system* claims comprising *a database* and *a module* for performing the method of claims 1-5 and 11-15. However, the claims fail to recite apparatus or computer hardware, computer readable medium or related processing apparatus for performing the functions required of the database and module. Claims to a “system” without structure or apparatus are indefinite as to which statutory

class the invention belongs. (Examiner notes that the disclosure as a whole recites no computer related apparatus or hardware of any kind.)

For the purposes of examination on the merits only, lacking a statutory class under which to examine these system claims or guidance from the specification as the structure of the system, claims 6-10 and 16-20 will be interpreted as process claims performing the recited functions.

Claims 26-30 recite product-by-process claims directed to an integrated circuit product produced by the process recited in claim 21. However, it is unclear what is encompassed by the claimed integrated circuit product as no specific structure is provided in the specification for the product, and because the steps of the recited process do not imply any structure to the product. See MPEP ¶ 2113 ("product-by-process claims are not limited to the manipulations of the recited steps, only the structure implied by the steps."). As there is no structure disclosed for the integrated circuit product and none implied by the process, the product claim is indefinite.

For the purposes of examination, claims 26-30 will be interpreted as reciting: *A method of dispatching demand for an integrated circuit product comprising the steps of....*

12. Appropriate amendment or clarification on all points raise above is requested.

Claim Rejections - 35 USC § 101

13. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

14. Claims 1-30 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Based on Supreme Court precedent and recent Federal Circuit decisions, for a process to be patentable subject matter under § 101 the process must (1) be tied to another statutory class of invention (such as a particular apparatus) or (2) transform subject matter to a different state or thing. See *Diamond v. Diehr*, 450 US 175, 184 (1981); *Parker v Flook*, 437 US 584, 588 n9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 US 780, 787-88 (1876). If neither of these requirements is met by the claim, the method is not a patent eligible process under section 101.

In the present invention, claims 1-5, 11-15, and 21-30 recite method (process) claims directed to calculating a planned allocation of demand based on computed quantities of low and high risk demand. In light of the specification, the claimed step of “dispatching parts...” refers merely to mathematically allocating portions of demand. (The term “part” as used in the claim means “portion of” not “part” as in a physical component of a product.) The specification discloses no apparatus, no computer hardware, and therefore no particular apparatus for performing these methods as claimed and none is positively recited in the claims. As such the claims recite process not tied to another statutory class of invention or transforming subject matter to a different state or thing, and are therefore not patent eligible under 35 U.S.C. 101.

Claims 6-10, 16-20 recite *system* claims comprising a *database* and a *module* for performing the method of claims 1-5 and 11-15. However, claims to a system without

structure for storing a database or a processor for executing a module is disembodied data and software per se. A system of disembodied data and software per se is nonstatutory.

15. Appropriate amendment is requested.

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. Claims 1-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hood et al. ("Capacity planning under demand uncertainty for semiconductor manufacturing," May 2003, herein Hood) in view of Milne et al. (US Pat. 5,943,484 herein Milne) and further in view of Connors et al. ("Methods for Job Configuration in Semiconductor Manufacturing", 1996, herein Connors) teaches basic job configuration in semiconductor manufacturing including organizing orders into jobs for dispatching to the fabrication line and optimizing job configuration for variation in yield.

The present invention is a method for dividing forecasted semiconductor product demand into two portions, assigning each portion a probability, and calculating an expected quantity of demand based on the quantity of the first and second portions multiplied, respectively, with the probabilities of the first and second portions.

Hood teaches capacity planning under demand uncertainty for semiconductor manufacturing using stochastic programming to optimize production from demand changes. Milne et al discloses a computer implemented method of allocating semiconductor manufacturing capacity to demand across multiple manufacturing facilities. Connors teaches basic job configuration in semiconductor manufacturing including organizing orders into jobs for dispatching to the fabrication line and optimizing job configuration for variation in yield.

Claim 1

Hood teaches dividing forecasted demand into multiple demand scenarios representing a quantity of forecasted demand, assigning each demand scenario a probability (see especially page 275, column 1, paragraph 1; Tables I, II, and III and page 277, Section V. “each scenario assigned a probability”), and determining expected quantities of demand using the quantities of the multiple portions and the respective probabilities of the portions (see Appendix, page 279, noting that while Hood teaches a more sophisticated equation encompassing multiple aspects of demand and operational planning for semiconductor production, in *de minimus* (simplification to the aspects contemplated by the present invention), Hood teaches calculating expected demand from at least two portions of demand by multiplying demand by each portions probability).

However, Hood does not expressly teach *dispatching the portions of demand to fabrication* the portions allocated based on expected demand.

Milne teaches in the art of semiconductor manufacturing the dispatching of portions of forecasted demand across fabrication facilities, where demand is first divided into two or more portions (see Figure 1, MRP, LPMRP, and Non-critical) and allocated according to yield expectations. Connors further teaches determining the volume of jobs to be released into production and that demand allocation is adversely (risk) affected by yield loss in fabrication.

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply the methods of Hood for dispatch of semiconductor production as this would simply have realized the actual production of semiconductor products using old and well known manufacturing process for allocation production of multiple portions of demand using old and well known fabrication allocation methods using improved and thus more accurate demand forecasts based on risk and probabilities attributed to portions of demand.

Claim 2

As above in claim 1, Hood teaches determining expected quantity of demand by multiplying probabilities of demand with the respective portions of demand. The equation $EQ = FQ \cdot FOR + SQ \cdot SOR$ is merely a mathematical statement to this effect.

Claims 3 and 4

Hood in view of Milne and Connor teaches or suggests the demand dispatching method as in claim 1, and in view of Hood teaching *multiple* portions of demand also teaching or suggesting dispatching a *third* quantity of the low risk demand of a second demand dispatched to a second fabrication to the first fabrication if the difference

between the expected quantity and the first quantity is exceeding a predetermined ratio of the expected quantity (see page 279 of Hood, A.5 Operation Balance equation and related discussion teaching allocation of demand according to probabilities *balanced* across toolsets (production capacity) such that overall production of demand is optimized for capacity allocation).

Claim 5

Hood in view of Milne and Connor teaches or suggests claim 3; however Hood alone does not expressly teach monitoring the variation of a quantity demand and dispatching a pilot order to fabrication if the variation shows a downward trend.

Connors teaches monitoring the variation (yield loss) of semiconductor wafer manufacturing and adjustments to production to meeting servicing requirements (see page 403 "Yield Models"). It would have been obvious to one of ordinary skill in the art at the time of invention to increase production (i.e. dispatching additional "pilot" orders to fabrication) if the variation in production for a fabrication facility shows a downward trend, as unmet demand would have increased as yield decreased leading to failure to service customer orders at acceptable levels.

Claims 6-30 recite method and system claims for performing the methods of claims 1-5 and are similarly rejected for reasons given above for the respective claim and claim elements.

Conclusion

22. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Feigin et al. (1999) teaches capacity allocation in semiconductor fabrication including adjusting allocations based on forecasted demand risk.

Cakanyildirim et al. (2002) teaches methods of quantifying risk associated with capacity acquisition using probabilistic demand forecast models.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dave Robertson whose telephone number is (571)272-8220. The examiner can normally be reached on 9 am to 5 pm, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Beth Van Doren can be reached on (571) 272-6737. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Dave Robertson/
Examiner, Art Unit 3623

/Beth Van Doren/
Supervisory Patent Examiner, Art Unit 3623